

Plants

1-2 The student will demonstrate an understanding of the special characteristics and needs of plants that allow them to survive in their own distinct environments. (Life Science)

1.2.1 Recall the basic needs of plants (including air, water, nutrients, space, and light) for energy and growth.

Taxonomy level: 1.2-A Remember Factual Knowledge

Previous/Future knowledge: In kindergarten (K-2.1), students recognized the needs of organisms (including air, water, food, and shelter). In 2nd grade (2-2.1), students will recall the basic needs of animals (including air, water, food, and shelter) for energy, growth, and protection. Students will take this information and expand their knowledge of basic needs of plants in 3rd grade (3-2).

It is essential for students to know that plants have basic needs that provide energy so the plants can grow and be healthy. The basic needs of plants include:

Air

- Plants need air to make their own food and grow.

Water

- Plants need water to make their own food.
- Too much water or too little water could cause the plant to die.

Nutrients

- Plants need special nutrients to help them grow and stay healthy.
- Nutrients can be found in the soil or water.
- Just as with water, too many nutrients or too few nutrients could cause the plant to die.

Space

- Plants need a certain amount of space to grow.
- The space below the ground allows the plant to get the water and nutrients it needs.
- The space above the ground allows the plants to get the light and air it needs.
- If there are too many plants in a particular area, the plant may not get the materials it needs to grow.

Light

- Plants need light to make their own food and grow.
- Plants can get light from the Sun or from indoor light (light bulbs).

It is not essential for students to go beyond the five basic needs as listed at this time.

Assessment Guidelines:

The objective of this indicator is to *recall* that plants have basic needs for energy and growth; therefore, the primary focus of assessment should be to remember what a plant needs and how it relates to plant growth and giving the plant energy. However, appropriate assessments should also require students to *recognize* the basic needs of plants using drawings, symbols, or words.

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1-2.2 Illustrate the major structures of plants (including stems, root, leaves, flowers, fruits, and seeds).

Taxonomy level: 2.2-A Understand Factual Knowledge

Previous/Future knowledge: This is the first time that students have been introduced to the structures of plants. Students will take this information and expand their knowledge of plant structure in 3rd grade (3-2). In 6th grade (6-2), the student will study the structures, processes, and responses of plants that allow them to survive and reproduce.

It is essential for students to know the major structures of plants.

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Stems The part of the plant that grows out of the ground and supports the leaves, flowers, and fruit

Root The part of the plant that grows in the ground and holds the plant in place

Leaves A flat, usually green part of the plant that grows from the stem

Flowers Flowers have petals that come in many different shapes, sizes, and colors

Fruits The part of the flowering plant that contains the seeds

Seeds The part of the flowering plant that will grow into a new plant

It is not essential for students to know the functions of these structures.

Assessment Guidelines:

The objective of this indicator is to *illustrate* major structures of plants; therefore, the primary focus of assessment should be to give examples of or use illustrations to show aspects of these structures. However, appropriate assessments should also require students to *identify* plant structures from a picture or drawing.

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1.2.3 Classify plants according to their characteristics (including what specific type of environment they live in, whether they have edible parts, and what particular kinds of physical traits they have).

Taxonomy level: 2.3-B Understand Conceptual Knowledge

Previous/Future knowledge: This is the first time that students have been introduced to these characteristics of plants. Students will not specifically study plants structures again until 6th grade (6-2) when the student will demonstrate an understanding of structures, processes, and responses of plants that allow them to survive and reproduce.

It is essential for students to know that each plant has a specific environment they call home, that some plants have parts we can eat, and that some plants have physical traits that make them unique from other plants.

Environment

- The surroundings of living things: the air, water, plants, animals, and Earth.
- Each plant has a particular environment where they thrive. For example, a cactus likes hot, dry environments. It would not survive outdoors in an environment that had snow most of the time.

Edible parts

- The part of the plant you can eat. Some examples of plant parts that can be eaten are:
 - Stems: asparagus, celery, onions
 - Roots: carrots, beets, radishes, yams, turnips
 - Leaves: lettuce, spinach, cabbage
 - Flowers: broccoli, cauliflower, artichokes
 - Fruit: tomatoes, peaches, pumpkins, apples, oranges, cucumbers
 - Seeds: wheat, rice, corn, beans, peas, nuts

Physical traits

- Something that makes one plant different from another. Examples of physical traits are the shape of leaves, the color of flowers, spines on a cactus, thorns on a rose or the stalk of celery.

NOTE TO TEACHER: Select plants and plant parts from some of the examples listed above in this indicator.

It is not essential for students to know every plant that can be found.

Assessment Guidelines:

The objective of this indicator is to *classify* plants according to their characteristics; therefore, the primary focus of assessment should be to determine whether a plant belongs to a category based on its descriptions. However, appropriate assessments should also require students to

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recognize the specific environment where a plant lives; *identify* an edible and an inedible plant; or *illustrate* using pictures or words an environment where a plant would thrive.

1.2.4 Summarize the life cycle of plants (including germination, growth, and the production of flowers and seeds).

Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: In Kindergarten (K-2.5), students recognized that organisms go through changes of growth called life cycles. This is a foundational concept that students will develop further in 3rd grade (3-2.1) when students illustrate the life cycles of seed plants and various animals and summarize how they grow and are adapted to conditions within their habitats. In 6th grade (6-2.5), students will summarize each process in the life cycle of flowering plants (including germination, plant development, fertilization, and seed production).

It is essential for students to know that plants have life cycles with distinct stages. A plant's life cycle describes the stages it goes through during its life or how it germinates, grows, flowers, and seeds. The four parts of a life cycle students need to know at this grade level are:

Germination

- The process in which a plant begins to sprout or grow from the seed

Growth

- The process of increasing in size and developing from a seedling to a mature plant

Flowers

- The part of the plant that makes seeds.
- Flowers have to receive pollen to make seeds.
- Most flowers have special characteristics such as color or scent, which usually attract different insects.
- Insects carry this pollen from flower to flower.

Seeds

- The seed is what flowering plants grow from.
- It contains the “baby” plant and the food it will need to grow.
- The seed is usually covered with a protective covering.

It is not essential for students to know how seeds are produced (fertilization) or the parts of the flower that make seeds. Students do not need to know about plants that grow from spores.

Assessment Guidelines:

The objective of this indicator is to *summarize* the stages of plant growth and development; therefore, the primary focus of assessment should be to generalize the parts in the life cycles. However, appropriate assessments should also require students to *illustrate* life cycles of plants using words, pictures, or diagrams; or *classify* by sequencing the stages of growth.

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1.2.5 Explain how distinct environments throughout the world support the life of different types of plants.

Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: This is the first time that students have been introduced to distinct environments and the concept that they support different types of plants. It is a foundational concept that will be developed further in 3rd grade (3-2.3) when students recall the characteristics of an organism's habitat that allow the organism to survive there. In 4th grade (4-2.2), students will explain how the characteristics of distinct environments (including swamps, rivers and streams, tropical rain forests, deserts, and the polar regions) influence the variety of organisms in each.

It is essential for students to know that plants require air, water, nutrients, space, and light. A *distinct environment* is a special surrounding that supports the life of different plants. Plants can survive only in environments in which their needs can be met. The world has many different distinct environments that support varied types of plants.

- One example of a distinct environment is the desert. The desert has plants that often have a special water storage system. Other plants may have especially long roots that spread out to reach as much water as possible. Cacti (the plural form of cactus) are one of the best-known desert plants. Cacti are designed to store water from one rainfall to the next.
- Another example of a distinct environment that is nearby is the schoolyard. There are plants living in the shade, in a crack in the sidewalk or parking lot, where the soil is wet or the environment is always sunny.

It is not essential for students to study all distinct environments (biomes) but a study of more than one distinct environment is needed to completely cover the indicator.

Assessment Guidelines:

The objective of this indicator is to *explain* how distinct environments throughout the world support the life of different types of plants; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various ways that the types of plants are affected by the distinct environments. However, appropriate assessments should also require students to *recall* that plants can only thrive where their needs can be met; *exemplify* environments and the conditions that support plants; *identify* a plant that would live in a distinct environment; or *summarize* the characteristics of an environment and the types of plants growing there.